

Claims

1. A method for signaling based on paging channel loading comprising:
determining that an MS needs to be paged;
5 determining a paging channel loading level for each of a plurality of cells in which the MS may be located;
paging the MS only in those cells of the plurality of cells in which the paging channel loading level is below a paging threshold.
- 10 2. The method of claim 1, wherein the plurality of cells comprises cells in a paging zone of the MS.
3. The method of claim 1, further comprising when a page response is received from the MS in a cell, sending short messaging to the MS in the cell.
- 15 4. The method of claim 3, wherein short messaging comprises messaging from the group consisting of data burst messaging (DBM), short message service (SMS) messaging, short data burst (SDB) messaging, a data packet, and notification messaging.
- 20 5. The method of claim 3, wherein sending short messaging to the MS in the cell comprises sending the short messaging without at least one optional field of the short messaging when the paging channel loading level of the cell is above an overloaded threshold.
- 25 6. The method of claim 1, further comprising when a page response is received from the MS in a cell, sending channel assignment messaging to the MS in the cell to assign a traffic channel to the MS.
- 30 7. The method of claim 6, further comprising sending short messaging to the MS via the traffic channel.

8. The method of claim 1, further comprising paging the MS only in those cells of the plurality of cells in which the paging channel loading level is below a paging threshold after determining that the service triggering the page is delay tolerant.

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9. The method of claim 8, wherein determining that the service triggering the page is delay tolerant comprises determining that the service is a voice call and the MS has a slot cycle index less than two.

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10. The method of claim 1, further comprising when no page response is received from the MS after paging in only those cells of the plurality of cells in which the paging channel loading level is below a paging threshold, paging the MS in at least one of those cells of the plurality of cells in which the paging channel loading level is above the paging threshold.

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11. The method of claim 1, further comprising when no page response is received from the MS after paging in only those cells of the plurality of cells in which the paging channel loading level is below a paging threshold, paging the MS in those cells of the plurality of cells in which the paging channel loading level is above the paging threshold.

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12. A method for signaling based on paging channel loading comprising:
determining that short messaging needs to be sent to an MS;
determining a paging channel loading level for each of a plurality of
cells in which the MS may be located;
- 5 transmitting the short messaging to the MS only in those cells of the
plurality of cells in which the paging channel loading level is below a short
messaging threshold.
13. The method of claim 12, wherein short messaging comprises
10 messaging from the group consisting of data burst messaging (DBM), short
message service (SMS) messaging, short data burst (SDB) messaging, a
data packet, and notification messaging.
14. The method of claim 13, wherein notification messaging comprises
15 messaging from the group consisting of email notification messaging, voice
mail notification messaging, and presence notification messaging.
15. The method of claim 12, further comprising when no short messaging
response is received from the MS after transmitting the short messaging to
20 the MS only in those cells of the plurality of cells in which the paging channel
loading level is below a short messaging threshold, transmitting the short
messaging to the MS in at least one of those cells of the plurality of cells in
which the paging channel loading level is above the short messaging
threshold.
- 25 16. The method of claim 12, further comprising paging the MS only in
those cells of the plurality of cells in which the paging channel loading level is
above the short messaging threshold and below a paging threshold.
- 30 17. The method of claim 16, further comprising when a page response is
received from the MS in a cell, sending the short messaging to the MS in the
cell.

18. The method of claim 17, wherein the sending short messaging to the MS in the cell comprises sending the short messaging without at least one optional field of the short messaging when the paging channel loading level of the cell is above an overloaded threshold.

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19. The method of claim 16, further comprising when a page response is received from the MS in a cell, sending channel assignment messaging to the MS in the cell to assign a traffic channel to the MS.

10 20. The method of claim 19, further comprising sending the short messaging to the MS via the traffic channel.

21. The method of claim 16, further comprising when no page response and no short messaging response are received from the MS, signaling the
15 MS in at least one of those cells of the plurality of cells in which the paging channel loading level is above the paging threshold.

22. The method of claim 21, wherein signaling the MS comprises paging the MS.

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23. The method of claim 21, wherein signaling the MS comprises transmitting the short messaging.

24. A radio access network (RAN) comprising:
wireless transceiver equipment adapted to support signaling
transmission and reception for each cell of a plurality of cells;
a communications controller, communicatively coupled to the wireless
5 transceiver equipment for each cell of the plurality of cells,
adapted to determine that an MS needs to be paged,
adapted to determine a paging channel loading level for each of
the plurality of cells in which the MS may be located,
adapted to page the MS via the wireless transceiver equipment
10 for only those cells of the plurality of cells in which the paging channel loading
level is below a paging threshold.
25. The RAN of claim 24, wherein the communications controller is further
adapted, when a page response is received from the MS in a cell, to send
15 short messaging to the MS via the wireless transceiver equipment in the cell.
26. The RAN of claim 24, wherein the communications controller is further
adapted, when a page response is received from the MS in a cell, to send
channel assignment messaging to the MS via the wireless transceiver
20 equipment in the cell, to assign a traffic channel to the MS.
27. The RAN of claim 26, wherein the communications controller is further
adapted to send short messaging to the MS via the wireless transceiver
equipment and the traffic channel.
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28. The RAN of claim 24, wherein the communications controller is further
adapted, when no page response is received from the MS after paging in only
in those cells of the plurality of cells in which the paging channel loading level
is below a paging threshold, to page the MS via the wireless transceiver
30 equipment in at least one of those cells of the plurality of cells in which the
paging channel loading level is above the paging threshold.

29. A radio access network (RAN) comprising:
wireless transceiver equipment adapted to support signaling
transmission and reception for each cell of a plurality of cells;

a communications controller, communicatively coupled to the wireless
5 transceiver equipment for each cell of the plurality of cells,
adapted to determine that short messaging needs to be sent to
an MS,

adapted to determine a paging channel loading level for each of
the plurality of cells in which the MS may be located,

10 adapted to transmit the short messaging to the MS via the
wireless transceiver equipment for only those cells of the plurality of cells in
which the paging channel loading level is below a short messaging threshold.

30. The RAN of claim 29, wherein the communications controller is further
15 adapted, when no short messaging response is received from the MS after
transmitting the short messaging to the MS only in those cells of the plurality
of cells in which the paging channel loading level is below a short messaging
threshold, to transmit the short messaging to the MS via the wireless
transceiver equipment in at least one of those cells of the plurality of cells in
20 which the paging channel loading level is above the short messaging
threshold.

31. The RAN of claim 29, wherein the communications controller is further
adapted to page the MS via the wireless transceiver equipment only in those
25 cells of the plurality of cells in which the paging channel loading level is above
the short messaging threshold and below a paging threshold.

32. The RAN of claim 31, wherein the communications controller is further
adapted, when a page response is received from the MS in a cell, to send the
30 short messaging to the MS via the wireless transceiver equipment in the cell.

33. The RAN of claim 31, wherein the communications controller is further
adapted, when a page response is received from the MS in a cell, to send

channel assignment messaging to the MS via the wireless transceiver equipment in the cell, to assign a traffic channel to the MS.

34. The RAN of claim 33, wherein the communications controller is further
5 adapted to send the short messaging to the MS via the wireless transceiver equipment and the traffic channel.

35. The RAN of claim 31, wherein the communications controller is further
10 adapted, when no page response and no short messaging response are received from the MS, to send the MS via the wireless transceiver equipment in at least one of those cells of the plurality of cells in which the paging channel loading level is above the paging threshold.